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FEDERAL-STATE COOPERATIVE
SNOW SURVEYS AND IRRIGATION

WATER SUPPLY FORECASTS

FOR

RIO GRANDE BASIN

March 1, 1952



Report Prepared

by

Homer J. Stockwell, Irrigation Engineer

Division of Irrigation Soil Conservation Service Colorado Experiment Station Fort Collins, Colorado

General Series Paper No. 511 Colorado Agricultural Experiment Station MOUNT WATER OUR

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## WATER SUPPLY OUTLOOK RIO GRANDE AND CANADIAN DRAINAGE BASINS March 1, 1952

In contrast to the past two years, the water supply outlook for the Rio Grande and its tributaries is very favorable as of March 1, 1952. Snow water content measured on snow courses surrounding San Luis Valley and in extreme northern New Mexico are far in excess of any previous March 1 measurement recorded at the end of the snow accumulation season. During February snow fall in mountain areas was about normal. To the south in New Mexico near Santa Fe the snow cover decreases sharply and only normal snow fall has occurred. Soil moisture conditions are reported as fair to poor along the Rio Grande. The flow of the Rio Grande is about normal in San Luis Valley and in New Mexico.

#### RIO GRANDE AND CANADIAN RIVER

Snow accumulation is the highest since snow surveys began in 1936 on the Rio Grande watershed in Colorado and extreme northern New Mexico. At medium elevations of 9,000 to 10,000 feet the snow water content measurements as of March 1 exceed those of any previous date including April 1. Snow surveys were made before the general storm of March 1-3. Up to 40 inches of new snow has been reported at Wolf Creek Pass from this storm. The snow cover extends to the foothills in some districts but there is very little snow on the valley floor. Soil under the snow is wet and unfrozen on most medium elevations courses. Soil moisture conditions in valley areas along the Rio Grande are fair to poor.

The snow cover diminishes rapidly in New Mexico to near Santa Fe and in the Jemez Mountains where near normal snow fall has occurred. Snow is well above normal on Canadian River tributaries in the Eagle Nest Lake area but the decrease in snow cover is rapid to the east and south. Reservoir storage along the Rio Grande and Pecos is very low.

Ordinarily no forecost is made in March 1 reports as to actual flow to be expected from the snow melt. The snow accumulation season on the Rio Grande is about 75 percent complete as of March 1 so wide errors in estimates must be expected. These errors are due to differences in snow accumulation through the remainder of the season. However, due to the unusually high snow cover this year the following estimates are presented for the April-September flow of the Rio Grande at Del Norte and at Otowi Bridge. The minimum, most probable and maximum flows shown below are based on snow accumulation that has actually occurred after March 1 during the past twelve-year period from 1939-1951.

#### Estimated Flow April - September 1952 (Acre-Feet)

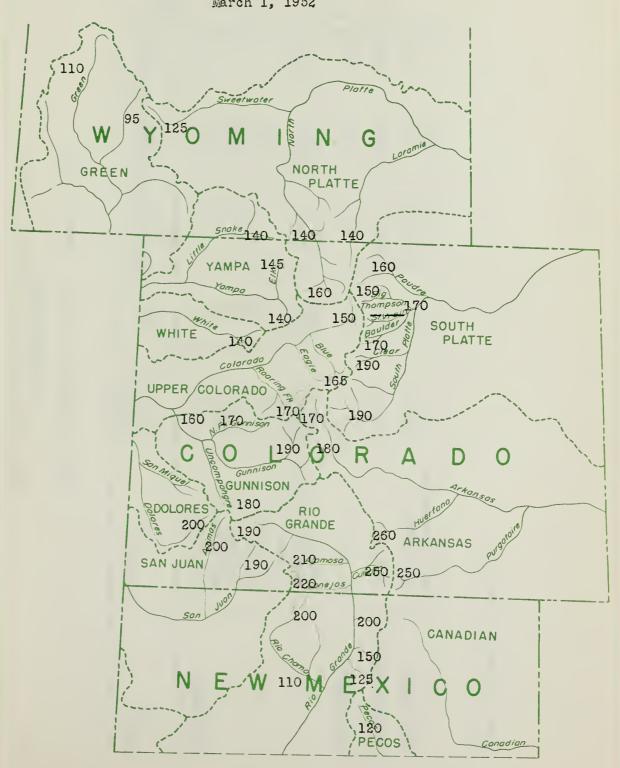
Gaging Station	Minimum	Most Probable	Maximum
Rio Grande at Del Norte	900,000	1,150,000	1,500,000
Rio Grande at Otowi Bridge	1,300,000	1,700,000	2,500,000

The average April-September flow for the past ten-year period is approximately 575,000 acre feet at Del Norte and 850,000 acre-feet at Otowi Bridge.



WATER CONTENT OF SNOW ON THE WATERSHEDS OF
PLATTE, ARKANSAS, UPPER COLORADO AND RIO GRANDE BASINS
BASED ON SNOW SURVEYS MADE APPROXIMATELY FIRST DAY OF MONTH

In Percent of Normal March 1, 1952



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SNOW SURVEYS AND IRRIGATION WATER FORECASTS RIO GRANDE BASIN

STATUS OF RESERVOIR STORAGE, March 1, 1952

STREAM	RESERVOIR	USABIE		000 A F. S	1,000 A.F. Storage, March 1	ch 1	
		1000 A.F.	1952	1951	1950	1949	1949   10-yr. Avg.   1942-1951
RIO GRANDE	Rio Grande	15.0	5.5	4.2	29.8	17.5	16.9
	Santa Maria	15.0	2.8	2.6	22.9	6*1	17.4
	Sanchez	103.0	፠፟	3.4	12.8	5.4	13.7
	Terrace	17.7	2,2	1.4	7.1	1.7	3.6
	Continental	26.7	3.0	3.8	18.7	3.2	8.6
	Platoro	0.09					
	Elephant Butte	2273.7	17.4	298,8	650.5	519.1	952.1
	Caballo	365.0	86.5	160,3	270•2	160.2	254.0
CHAMA RIVER	El Vado	226.0	OLO	5.0	92.0	101.0	62,1
CANADIAN RIVER	Conchas	0.009	216.4	293.7	316.0	309.2	9गगर
PECOS RIVER	Alamogordo McMillan-Avalon	148.0	31.5 4.7	10.8	10.2	30.4	70.0

\*Some for shorter periods.

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# SNOW SURVEYS AND IRRIGATION WATER FORECASTS for RIO GRANDE BASIN March 1, 1952

SUMMARY OF MARCH 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS
BY WATERSHEDS

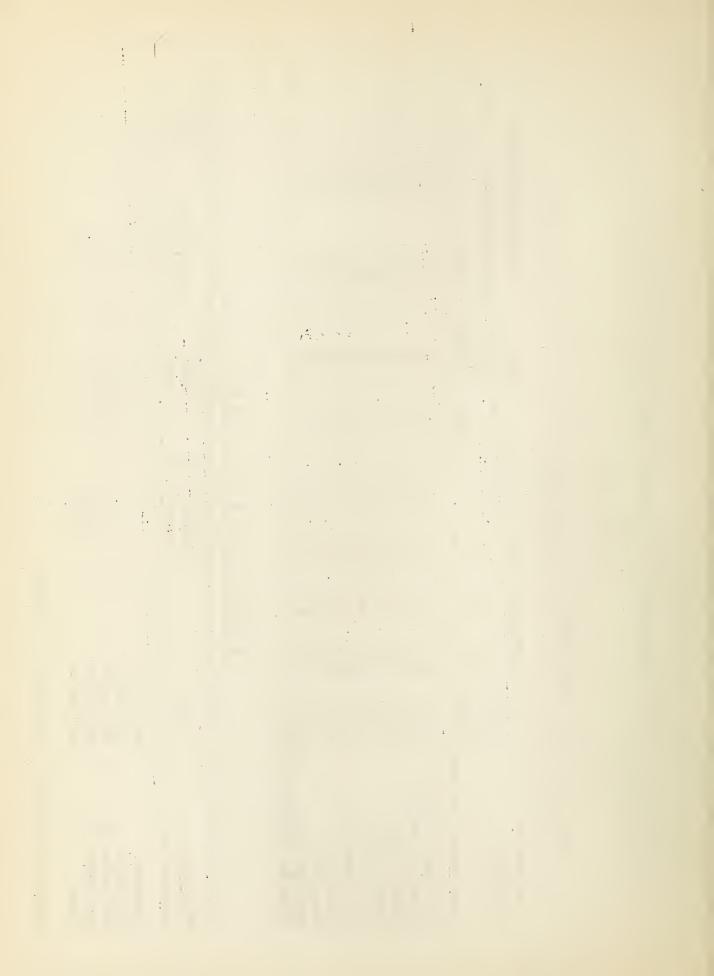
	-1	- 15	-	1	The	N. O. F.	Chotte	1052 Wat.	1052 Water Content in	
	Snow	Snow Wa	ter cor	tent 11	Vater Content in Inches No. 01	TO ON	ONION.	7//1		
WATTER	Denth				15 yr.*	courses	Densi ty	perce	percent of	
	1952 Inches	1952	1951	1950	Avg.	in Awg.	1952 Percent	1951	15 yr. Avg.*	
Rio Grande (Colo.) Upper Rio Grande	54.9 65.4	18.0	5°4 8°2	13.9	8.7 11.3	n u	377	328 270 El:0	208 198	
Alamosa River	42.1	14.0	2.6	12.7	12.0	-1 M	3,55	362	230	
Culebra River	61.6	22.2	1,02	7-7	8.8	r-1 ;	36	230	252 163	
Rio Grande (N.M.)	30.3	10,1	0,-	74.2	0° 6	<b>=</b> "	2 %	328	791	
Chama River	11.1	Itte a	- t-	7.0	, <u>.</u>	۰ ۱	~~~ ~~~~	120	ازاد	
Pecos River	18.7	5.2	T ,	ۍ د د د	1 \ 0 (	Λ-i	0 0	228	55	
Canadian River	32.6	9.3	3.9	J.T	2.7	77	23	200	1/4	
* Some for shorter nerinds	iods									

\* Come for shorter perloas

DATA PRECIPITATION

			4		Denarture
WATERSHED	STATE	Precipitation Actober 1 to February 29	peparture from normal	Precipitation February	from Normal
Canadian Rio Grande Rio Grande (N) Rio Grande (S) Pecos	New Mexico Colorado New Mexico New Mexico	6.58 4.13 9.98 3.35 4.90	-0.87 +1.17 +0.19 -2.37 -3.36	0.28 0.09 0.54 0.35	-0.40 -0.38 -0.74 -0.10 -0.10

\*Average of Selected High Elevation Stations



-4-RIO GRANDE DRAINAGE SNOW SURVEYS March 1, 1952

100		Hast necord	ىد		23.3	9*9	5.2	9.9	7.0	16.1	19.3	4.2	8 8	2.8	16.1	9.5	20.0	6.8	6.5	7-4	7.°	9•7	1	1	i	1	8.7	c c	Ø.C.	0.0	11.3	
mou its co	Tagar Cill	Yrs. of	Rec.		15	17	15	15	14	12	15	13	12	Ħ	M	m	m	2	2	m	m	m	<b>~</b>	Н	<b></b> 1	Н		l r	T .	77.	7	
Course Mesentage		(Inches	1950		31.0	6.5	7.0	8.2	4.9	18.6	19.2	4.3	7.7	0.0	16.4	10.3	19.5	6.8	6.5	3.4	ν, ν	5.6	1	1	ì	1	α. .Σ	6	0.15 0.10	 	13.0	}
Snow	1	Content	1951		18.3	3.2	5.6	4.1	9.4	11.0	13.2	3.1	1,2	0.5	9.1	5.3	13.4	1	1	3.0	5,1	7.7	9.9	23.9	0.9	15.2	5.4	,	10°2	N 0	200	 ; ;
	Water	Jane	1952		1,6.3	11.7	14.0	19.0	18.0	1		8.2	22.2	4.3	ł	20.9	\$2.8	15.0	13.8	8.3	10.3	بر بر	174.7	0.01	15.9	42.2	18.0	,	7.01	11.7	200	;
	Caron	onow Depth	(Inches)		117.6	8-ए।	42.1	52.0	148.0	ļ		36.8	9.19	21.5		1.19	0.771	6.81	1797	32.6	36.0	29.2	57.4	105.6	51.7	116.0	54.9	t !	0-) 11	11.8	55.10 57.10	† • · · · · · · · · · · · · · · · · · ·
7775	1	Date	. 03					00 2/28		1				00 3/2	1 00	50 3/4		C)		3	2	2	બ	2		2/29	for drainage		7/27	7/6/03	9700 3/1 drainage	) O
March	-	e El ev.		_	10000	935	96	93(	9300	11500	10000	.9700	10000	8200	999	9450	10100	10300	10900	10000	9300	10000	9800	11000	10400	11000			OCCUPATION OF THE PROPERTY OF	9350	for dra	
		Range			Œ	与	冠	<b>8</b>	70W	当	出	R2	105.2	721	M	当	五	秃	R	SE E	띰	黑	Œ	뙶	R	2E	rerage	_{	된.	<b>雪</b> 5	7 g	)
Location		Two			37N	NOT	36N	33N	288	37N	32N	N T	37.2N	29N	36N	35N	32N	NT-	12N	N	NOT TON	15N	NI	12N	NI	37N	AV	i	<u>N</u>	NOT I	Avera	} •
Ī		Sec			7	13	15	25	22	30	17	8	<u>, ,</u>	13	22	25	24	56	2	19	32	12	15	13	2	9				ವ	0	
	M	and	State	COLORADO	26 0010	27 m	1,7 "	1,9 "	77 "	16 "	177 #	80 "	82 m	8h n	108 "	109 #	110 "	122 "	123 "	124 "	125 "	126 #	151 "	153 "	151 "	155 "				27 "		
		urainage pasin and	urse	RIO GRANDE IN COLO	Wolf Creek Pass	Upper Rio Grande	Silver Lakes	River Springs	LaVeta Pass #2	Summitville	Cumbres Pass #2	Santa Maria	Culebra	Ft. Garland	Platoro	West Conejos	La Manga	Pyramid	Spr. Creek Pass	Pool Table Mt.	Lake Humphreys	Cochetopa Pass	Howardville	Red Mt. Pass	Porcupine	Wolf Creek Summit		er	MOLL Ureek Pass	Upper Rio Grande	duta maria	



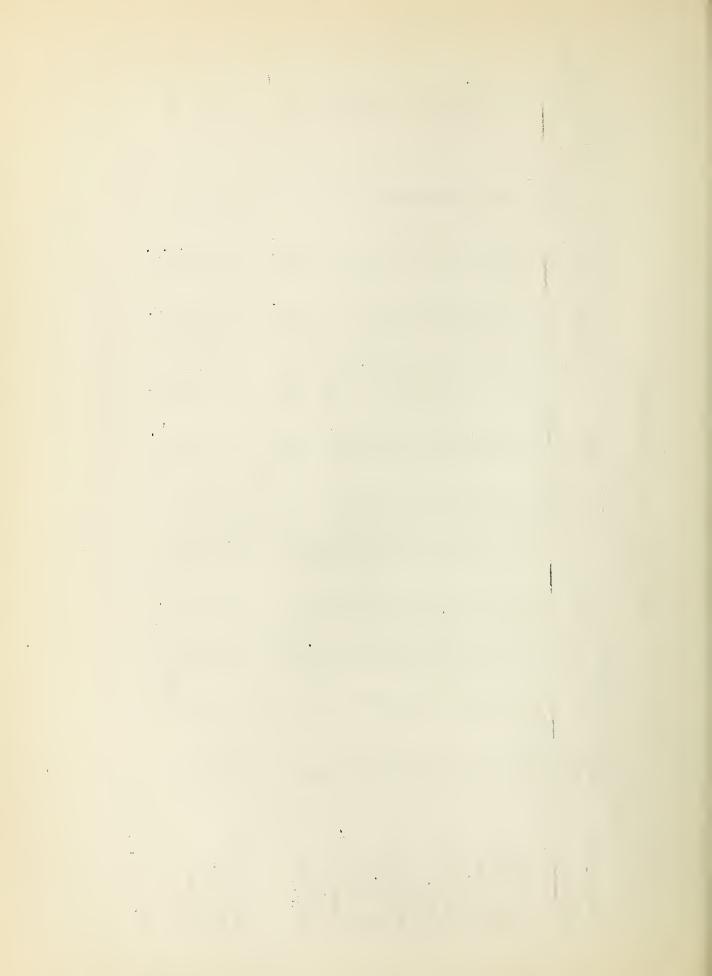
RIO GRANDE DRAINAGE SNOW SURVEYS March 1, 1952

	D.J.	Location	uc					S	Snow Cover	r Measur	Measurements	
Drainage Basin	No					Date	Snow	Water	Water Content		1	Past Record
and	and	Sec	Twb	Range	Elev.	of	Depth			1	Yrs. of	Av. Water Con-
Snow Course	State					Survey	(Inches)	1952	1951	1950	Rec.	tent (Inches)
ALAMOSA RIVER												
Silver Lakes	47 Colo.		36N	4	0096	3/2	42.1	14.0	5.6	7.0	15	5.2
Summitville	19 u	200	37N		11500		1	1	11.0	18.6	12	16.1
		Ave	Average for	r drainage	age		42.1	14.0	2.6	7.0		5.2
CONEJOS RIVER												
River Springs	49 0013	23	33N	6E	9300	2/28	52.0	19.0	<b>L</b> •1	8.2	15	9.9
Cumbres Pass #2	77 m	17	32N	民	10000				13.2	19.2	15	19.3
Platoro	108 "	22	36N	西	9950		1	1	9.1	16.4	m	16.1
West Conejos	109 "	25	35N	当	9450		67-7	20.9	ک	10.3	m	5.6
La Manga	110 "	24	32N		20100	3/4	114.0	1,2.8	13.4	19.5	m	20.0
		AV	Average f	or	drainage	•	77.9	27.5	<b>7.</b> 6	12.7		12.0
CULEBRA RIVER			_									
Cule bra	82 Colo.		37.2N	105.24 10000	10000	2/29	9*19	22.2	4.2	7.7	12	8.8
				RTC	RIO GRANDE IN		NEW MEXTCO					
CHAMA RIVER												
Cumbres Pass #2	77 5020.	17	32N	√ ∄	10000		y4 - 84		13.2	19.2	15	19.3
Pay Role	# #	16	28N	7E	0026		50.9	16.3	3.0	7.4	· #	80 70
Chama Divide	17 "			106.7W	7750		20.8	7.4	3.0	1.4	12	ν. Ο
Chamita	18 #			106.7W	8500		54.0	20.2	7.5	7.5		0.6
Bateman	29 m	ひ		<b>€</b> E	9300	2/27	54.6	16.6	0.9	11.4	2	8.7
		Ave	Average for	r drainage	age	•	11.1	14.8	4.5	5.4		7-5
PECOS RIVER			)		)							
Aspen Grove*	L N.M.	ω	28N	15E	9500		19.0	5.0	1,3	7.0	15	7,0
Panchuela	20 "	25	24N	16E	9200	2/28	11.5	3.2	1.0	1.2	15,	3.1
Big T esuque*	# t2	23	22N	13E	0006		25.6	7.4		11.8	0	٠ ١ ٢
Gallinas	25 "	22	22N	13E	10100		}		2.0	0	77	2.4
		Ave	Average for	drainage 1	900	•	78.7	л 0	-	7		- -
*Om adjacent drainage	nage		age + 0		2 2 2		- - - -	2.6	<b>↑•</b> †	· ·		7•4
	. 0										-	

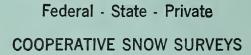
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RIO GRANDE DRAINAGE SNOW SURVEYS March 1, 1952

		1,000+100	. 03						200	c	3.6	1
		ומ	11011		ľ				0110	ollow cover Measurements	Measure	ments
Uralnage basin	NO.	_			1	Date	Snow	Water	Content	(Inches		Past Records
and	and	Sec.	dwI.	Range	Elev.	of	Depth				Yrs. of	Av. Water Content
Snow Course	State					Survey	(Inches)	1952	1951	1950	Record	(Inches)
							W MEXICO					
Red River	1 N.M.	59	28N	15年	9500	2/28	1,14.7	16.0	2.3	ۍ م.ه	15	7.5
Taos Canyon	5 #	2	25N		0006	2/29	26.0	7.7	1.2	3.8	15	6.2
Aspen Grove	<u>"</u> 1	12	18N		9100	2/28	19.0	5,0	1,3	1.0	15	7.6
Tres Ritos	12 "	23	22N	13E	0006	2/28	29.8	8,2	3.6	3.6	77	5,8
Pay Role	15 *	76	28N		9700	2/29	50.9	16,3	3.0	7.4	Ħ	8,5
Chama Divide	17 "		36.9N	$\Box$	7750	5/59	20.8	7.4	3.0	<b>1.</b> 4	12	0.10
Chamita	18 "		36.9N	2	8500	2/29	54.0	20.2	7.5	7.5	Ħ	0.6
Cordova	19 "		22N		10100	2/29	51.2	15.8	6.4	6.3	25	9.3
Panchuela #2	20 #	27	191	12E	8300	2/28	11.5	3.2	1.0	1.2	IJ	3.4
Big Tesuque	27 "	17	18N	118	10000	2/28	25.6	7•1	1:1	1,8	2	χ,
Elk Cabin	24 "	∞	18N		8250	2/29	7.6	3.6	0.0	0.0	7	3.9
Rio En Medio	26 m	∞	18N	~	10000	3/1	30.0	7.6	2.9	بر بر	2	1,2
Bateman	29 n	᠕	26N		9300	2/27	54:6	16.6	0.9	11.4	2	8.7
Costilla	30 "		37.0N	105.5W	10000				1.0	ł	<b>-</b> -1	1.0
Fenton Hill	æ	18	19N		8900		27.7	7.2	1	1		1
			Ave.	Average for	drainage	age	30.3	10,1	2.9	4.2		6.2
					MATCHANAS		BIVER					
Hematite Park	9 N. W.	∞	28N		9500		27.7	7,3	1,8	۲,	7,	<u>ر</u> بر
Ocate Mesa	10 #	. K	2 Lin	166	9200	2/25	20.0	ຸ້້	8 0	, C	1	, c.
Tres Ritos*	12 "	23	22N		0006	2/28	29.8	8.2	3.6	3.6	77	່ໜູ່
Cor dova*	19 "	22	22N		10100	2/29	51.2	15.8	6. Lt	6.3	20	9.3
			Average	for	drainage		32,1	9,3	3.9	3.1		5.9
*On adiacent drains							_					<del></del>
ישו מעלמטווי חיים	lidec											







Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"WATER IS THE WEST'S GREATEST RESOURCE"